



# GEOLOGICAL SOCIETY OF MINNESOTA NEWS

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## BOARD NEWS

The Board of Directors voted to purchase Peachtree accounting software at their March 4 meeting. Treasurer, Ed Huppler, will be learning the Peachtree double entry accounting system. In April, the Board voted to increase membership dues since they have not been adjusted for several years. The adjusted dues are listed in your new directory which was recently mailed to all paid members.

After many years of paying field trip leaders \$50 per day, the Board voted to increase leader's fees to \$75 per day. Also, a flat \$10 per person per day will be charged for field trip participation with kids under 18 free. This will ease the collection burden on the trip committee and in some cases, higher leader costs will be better covered.

Rick Hosterman became the new State Fair Exhibit chairperson and Alex Lowe will chair the Video Library Committee. Incidentally, all State Fair booth workers will have paid entrance tickets available to them if needed.

The fall Lecture and Lab Series is completed with the exception of a room number. The plan is to mail the Lecture Program with the next issue of this newsletter.

As in the infamous Mississippi River, things keep rolling along.

*Judy Hamilton*



*See page 6 for details*

## IN MEMORIAM

We were deeply saddened to learn of the death on June 23 of longtime member and friend of the Geological Society, George Johnson. He was 69. George and his wife Goldie had been members since 1976 and served the society in many capacities. George was president of GSM in 1984, and along with Goldie, served on the Board of Directors for four years. In 1983, George was on the social Activities Committee.

From 1984 to 1988, George and Goldie were

the newsletter committee. George also served on the Field Trip and Fair Committees. In recent years, the Johnsons hosted the GSM Board of Director's summer picnic and winter holiday party at their home in Wyoming, Minnesota. At the summer picnic, George always offered rides across Coon Lake in his boat.

## SUMMER DIGS

The South Dakota School of Mines and Technology is offering several great scientific excavations of important paleontological sites in the Black Hills region this summer. Participants work closely, in small groups, with scientists involved. Listed below are those digs:

July 1 to 12: 150th Anniversary Excavation in the Badlands National Park on a remarkable occurrence of **Giant Pigs, Three-Toed Horses, and Rhinoceroses**. This site presents some very interesting taphonomic questions. Leader: Philip Bjork

July 1 to August 2: Southern Black Hills **Marine Reptiles**. The careful search and documentation of the distribution of **mosasaurs, plesiosaurs, sharks, bony fish, and associated invertebrates**. Leader: Bruce Schumacher

July 15 to 26: **Jurassic Dinosaurs and Mammals** near Sundance, Wyoming. **Camarasaurus and Allosaurus** as well as tiny primitive mammals will be recovered. Leaders: James Martin and John Foster

August 19 to 30: **Marine turtles, mosasaurs and plesiosaurs** from the Late Cretaceous. Excavations along the Missouri River near Chamberlain, South Dakota. Leaders: James Martin and Gorden Bell

For more information, call 1-800-544-8162 ext. 2467

or Write: Dr. Philip Bjork  
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Rapid City, SD 57701  
pbjork@msmail.sdsmt.edu

*Flint: A variety of chert found as irregular nodules usually in chalk, which found good use as tools for Stone Age cultures who had no idea they were holding SiO<sub>2</sub>.*

# THE FLAMINGO AND THE DRAGON

OR

## THE REAL DIRT ON CRIME



A flamingo apparently upset by a slightly too boisterous, after-hours party at the Minnesota Zoo took to the wing to find quieter digs. What followed could have been straight out of Jurassic Park—the movie. Either the bird missed or misread the hulking form sharing its getaway space. Zoo keepers recovered a beak and a leg the following day. Results from the

forensic lab reinforced the circumstantial evidence: death by Komodo dragon. The Komodo aka “Maureen,” new to the Zoo at that time, apparently needed just such a snack to get her digestive juices flowing. She had refused all food up to that point.

Now what if Maureen had gone marauding and the next morning the zoo keepers arrived to find scattered legs and beaks in locations where there should have been flamingos? Maureen appears to be smiling a little more widely than usual otherwise everything is normal in the Komodo abode. How might the zoo sleuths finger the culprit? Maureen would already be under suspicion since we know she doesn't care for beaks. However, analyzing the stomach contents of a living Komodo dragon poses some interesting problems and it will be a while before the second “passing” of the flamingo is available for inspection. What can the zoo do?

They might try doing some forensic geology. Life has been leaving tracks in its wake ever since critters started to move. Mother Earth leaves sediments to get tracked by whatever means a life form uses and Komodos and flamingos aside, there is probably no more trackable creature than our own kind what with our tools, clothes, cars, etc. Sediments can in turn be traced back to their place of origin and the results can be highly incriminating. For fascinating peak at forensic geology in action, you will want to read *The New Yorker* magazine of January 29, 1996. Author and

geological writer John McPhee starts by following our own Karen Kleinspehn, then a graduate student, along the Platte River in Nebraska as she picks up pebble after pebble and mentally traces them back to their most likely nearby or not so nearby source. He notes she was right nine times out often.

From here McPhee recounts the case of the sheep rustler whose attempt to pull the wool over the eyes of investigators was foiled by the Triassic red sand embedded in that wool. He said he bought the sheep in Nebraska; the telltale wool said he really stole them from Red Mountain near Laramie, Wyoming. Sediment stratification was the clincher. The red beds exposed in Wyoming are hundreds of feet under the surface in Nebraska! Sedimentary strata also helped crack the case of the murderer of Ad Coors but these strata were measured in microfractions of an inch. The culprit had been careful to cover his tracks all the while he was recording his itinerary in tidy layers on the bottom of his car!

Geology, one could argue is basically a forensic science since the main questions are usually, what is it or what was it, where did it come from and how did it get where it is. The methods can be applied just as well to lizard's feet as to clothes, wool, or vehicle undercarriages although trying to convince Maureen that she “needs” a “manicure” could be a ticklish affair. Thanks to the GSM members who brought this interesting article to our attention and to Iris Von Bargen, Minnesota Zoo Volunteer, for the inside story on the disappearing flamingo. This *New Yorker* article is one of many done by John McPhee for, *the New Yorker*. When ever you see his name, you can count on some enjoyable and informative reading.



Dwight Robinson

**Ferruginous:** used to describe rocks or sediments containing iron; of, containing or similar to iron. From the Latin *ferrum* or iron.

# Geological Marker Project

This is the first of a two-part series on the Geological Marker Project. The first part, which follows, is a reprint from the GSM archives. This account of the Project was written by Lawrence W. King, Marker Chairman during the project's origination. The current status of the project will appear in the next issue of the *News*.

About 70 miles south of Oklahoma City, Highway 77 passes through a scenic and recreational area located in the granite stumps of the Arbuckle Mountains, an ancient range that crossed part of the state in an east-west direction. On the south flank of this granite core rests a series of upturned sedimentary formations, the outcrops of which are exposed at the roadside for several miles between Turner Falls Park and Ardmore to the south. On these exposures, the Lions Club of Ardmore has erected large wooden signs, describing each formation by name, character of deposit and its importance with respect to the oil industry of Oklahoma. About a dozen of these signs, spaced at varying intervals, give a comprehensive story of the geology and economic value of the sandstones, limestones and shales that comprise the oil bearing formations of this region. Written in nontechnical language, the texts provide information of interest not only to local residents but to the large number of travelers who use this busy highway.

The opportunity for a similar project in Minnesota is apparent to anyone who is at all familiar with the geology of the state. This is literally a geologist's paradise. Here are some of the oldest rocks to be found on the surface of the earth, some of the youngest deposits of the last glacier, as well as many of the igneous and sedimentary formations deposited in the intervening time. The volcanic activity here in ages past was exceeded in magnitude only on the Deccan Plateau in India and the Oregon Plateau in North America and has resulted in landscapes of striking beauty. At no other place on the continent is there a complete record of a glacial epoch. Practically, the state is

the geological as well as the geographical center of this landmass, with its rivers draining to Hudson Bay, the Atlantic Ocean and the Gulf of Mexico. These streams together with its more than 10,000 lakes, give Minnesota a water area greater than that of any other state.

The idea of presenting these unusual features in a manner similar to that used by the Lions Club, to travelers and residents alike, met with immediate favorable response. The University was especially interested in the project because it had no funds for a public educational program of this character. The Highway Department agreed to install tablets furnished by the Society at sites selected by the Society and to build parking areas where necessary to avoid conflict with highway traffic. After the program got under way, it was extended to include locations in city and state parks with the cooperation of the local governing authorities. In order to avoid expense of maintenance and in keeping with the dignified nature of the project, bronze was selected as the most appropriate and durable material. The Flour City Ornamental Iron Company agreed to absorb a part of the manufacturing cost of the tablets as its contribution to a public service program but even with these advantages it was apparent that this would be a costly project, requiring careful selection of locations in order to attract the maximum number of readers.

The directors of the Geological Society, impressed by the unusual opportunity at hand, agreed to sponsor such a program providing financial support could be obtained but realized that generous contribution from within the Society would be necessary before outside help could be expected and so it was decided to make the first

*Chert: A dense, hard siliceous rock made up of cryptocrystalline silica; a form of quartz. It occurs in beds or nodules in limestones and shales.*



tablet, to be erected at Taylors Falls, one in memory of Edward P. Burch, founder of the Society. The request for funds exceeded expectations with the results that memorial tablets were proposed for Mankato and Gooseberry Park. The initial enthusiasm was contagious so that thru special gifts, bequests and solicitations enough money was obtained for a total of eight tablets. On the strength of this accomplishment, the program was described to the Louis W. and Maud Hill Family Foundation with an application for a grant sufficient to obtain 20 tablets. The Geological Society agreed that all technical data would be edited by George A. Thiel, Chairman, Department of Geology, University of Minnesota and George M. Schwartz, Director, Minnesota Geological Survey, that all texts would be edited by the Minnesota Press, that the Society would give the Foundation a legible picture of each text and that a photograph of each installation would be included in a final report. Professors Thiel and Schwartz wrote individual letters supporting the project and the application was approved. With this financial help the 20 tablets were ordered for installation in

1955 and 1956 but the work was not completed and the final report made to the Foundation until November 23, 1959. Subsequently, the Society raised enough money for 3 more tablets, the last of which, intended for Lock and Dam number 5, was not completed until 1966, the delay being caused by highway construction in the area. In addition to the foregoing, one other marker for which the Society prepared the text, was purchased and installed by the Highway Department about 3 miles northwest of Wabasha on Lake Pepin to replace a tablet to which the commercial clubs objected because of reference to violent storms on the lake. The texts for these 33 markers comprising the Project to this point, have been published, along with a list of historical markers and monuments in a 1967 publication entitled "History Along the Highways." This 61-page pamphlet is out of print, but it is available for use at the Minnesota History Center research library. This publication is quite dated, but there are no plans at present to reprint it or publish another one.

*Judy Hamilton*

## AGATES NEEDED

The GSM Public Service Committee requests your help in serving the needs of Minnesota teachers. There has long been a need for classroom samples of Minnesota rocks, minerals, and fossils for our schools. No organization or institution has ever offered a comprehensive remedy to this problem until now. GSM plans to purchase up to 250 plastic boxes, with 18 compartments each, containing igneous, metamorphous, and sedimentary rocks from around the state. Many rock types we can get from quarries and have crushed. The Lake Superior Agate, a Minnesota classic, must be individually gathered. If you have any agates you would like to donate to this cause, please forward them to:

GSM Public Service  
Doug Zbikowski  
7833 Able Street N.E.  
Spring Lake Park, MN 55432  
or call 612-784-0201.



Thanks for you help.

*Cryptocrystalline: used to describe a crystalline structure that can only be seen using a microscope.*

# FOSSIL FIND

From articles by Tim Krohn in *The Free Press*—Reprinted with permission

A common Minnesota landscape, a gravel mine on a terrace of the meandering Minnesota River, has produced a surprising fossil cache. On a warm and sunny, early-spring weekend, it's a rockhound's nirvana; Southern Exposure. This mine isn't your usual gravel operation, it's also a kaolin clay mine and herein lies the treasure. During the mining process, the operator, Scott Gooler, of North Mankato, noticed an abundance of leaves—not just imprints, but actual leaves.

A dedicated rock hound, Gooler knew the find was important and contacted geologist Dale Setterholm at the Minnesota Geological Survey (627-4780), who in turn contacted fossil leaf expert Dr. David Dilcher at the University of Florida. What's this, we have no paleoleaf experts here in Minnesota?

Included in the find was an enormous leaf about 7 inches long and 3 inches wide, resembling a sycamore leaf. A more important find was one well-preserved fossilized flower. Dilcher reports the [Courtland] location has at least 15 plant species. There are other locations along the Minnesota River that have yielded only two or three different species of fossilized leaves. In the past, fossil leaves of sassafras, willow, poplar, and birch have been found near New Ulm.

Dr. Dilcher and samples returned to Florida, where studies will be conducted in a more hospitable climate. He estimates the fossils are about 95 million years old. If we check the Geologic Time Scale on our GSM Program, we'll see that is in the Cretaceous Period. It is believed this is near the time of the origin of flowering plants in North America, hence the importance of this discovery. (When speaking of Geologic time, a Geologist will usually add, "...give or take a few million years.")

This is also at the time dinosaurs were everywhere. While dinosaur bones are plentiful in South Dakota, few if any have ever been found in Minnesota. Many Geologists believe they had to have been here, and Dilcher believes they could have been munching on these plants.

Paleogeography during the Cretaceous Period has an ocean coming onto North America from the west. The ocean's eastern shores crossed the western borders of Minnesota and Iowa. Rivers flowed to the shores from the east, and this area was a low, swampy coastal plain. Dilcher

believes these leaves fell into rivers and were carried to quiet flood-plain lakes or other peaceful waters. They were buried in fine nonmarine sediments that formed the clay deposits Gooler has now uncovered. Later, the ocean expanded, bury-

ing the landscape beneath marine muds and silts. The kaolin clay is not the sticky clay you might find in your garden. Kaolin is actually a mineral, the other is just glacial till. While the dry, powdery clay is probably prevalent in the areas that bordered the ancient sea, it is easiest to extract along the Minnesota River valley. The Glacial River Warren removed much of the glacial drift and exposed the bedrock sequences.

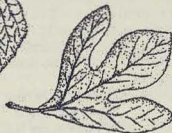
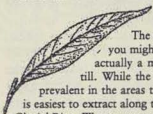
Gooler was able to learn about the quality of the clay and its potential uses thanks to a four-year study at the Natural Resources Research Institute in Duluth, a branch of the University of Minnesota. The possibilities for high-grade kaolin are limitless. It is used in making glossy magazine paper, livestock feed and medicine (the "Kao" in Kaopectate is kaolin). It's also used in the making of bricks and portland cement.

Gooler said the fossil leaves are so abundant at the mine that he may even be able to sell them as geological oddities in his Courtland Clay store. But at the time this cowboy visited the mine, nothing was to be found. Apparently, the Kao was working; the flow had diminished. However, Dale Setterholm believes more will be exposed as the mining progresses.

At the present time, Mr. Setterholm is putting together a presentation of this discovery. It will be given at a National Geological Society gathering at Ames, Iowa in May of this year. He was most generous in taking time to show me the box full of samples in his possession.

If you should travel in this direction some weekend, remember the quarry is on private property. To add to your adventure, follow the river northwest to Redwood Falls and see the

Geological marker in Alexander Ramsey Park. The plaque explains the natural process of clay formation, which is nicely demonstrated by the surrounding topography.



**Siliceous:** used to describe rocks or desposits containing silica.

# GSM HAS A LONG HISTORY

The Geological Society of Minnesota is an outgrowth of two activities of the early 1930s: (1) an Earth Science Club at the Minneapolis Public Library; and (2) the leadership of Edward Burch, an early electrical engineer who, upon retirement about 1930, took up geology as a hobby and brought his professional friends along on field trips.

GSM was incorporated in 1939 as a Minnesota non-profit educational organization. Since 1960, we have had an educational exhibit at the Minnesota State Fair spreading interest in geology to fairgoers who receive our forthcoming lecture series program.

From the beginning, GSM has had winter lectures and summer field trips. The lectures have been held at the University of Minnesota since 1950. Field trips at first were at nearby locations, but later trips were to places such as the Black Hills, the 1964 New York World's Fair, and more recently, to locations in the far west. In the early years, we had the help of Dr. George Schwartz, head of the University of Minnesota Geology Department, the Minnesota

Geological Survey and geologists from nearby colleges. We continue to use geologists from the Survey and teachers from Minnesota and Wisconsin colleges and universities.

When the founding generation retired in the 50s and 60s, our popular programs kept our membership to around 200. Geology is the foundation for many sciences and industries with growing importance worldwide. GSM can do even more in the future to broaden understanding of geology and its enjoyments.

Bob Handschin

*Bob has been a member of GSM since 1970 when he learned about the Society at the State Fair. Bob served as President in 1979 and has been and still is Librarian and Archivist.*

*(Bob says the late Mary Kimball was instrumental in getting Bob, his wife and four other couples actively involved in the Society.)*

## FROM THE CAPROCK

Perhaps you have noticed that the *News* is on a slightly erratic publication schedule. Unlike commercial publications, ours depends on the time and energy of volunteers, neither of which might always be there just when you need them. In looking back—something we try not to do unless the time spans can be measured in something really interesting like 100s, 1,000s or 1,000,000s of years—it hardly seems possible that four years have elapsed since Judy Hamilton and I took over the reins of the newsletter from the able hands of Allan Cox. At that time, we determined to make the *News* an even more timely and informative chronicle of Society events and geological happenings. Charlie Brennecke's expertise gave the news another boost and now his grandson David Yaffe is taking up where Charlie left off. I am pleased to note that all the feedback from you the members has been positive.

We really appreciate the tips and articles members have contributed as well. What we would really like to see is more articles from you the readers, such as the great articles in this issue by Bruce Goettman and Bob Handschin. Whenever you see an article or news item that looks really interesting, taking a few extra moments to write a summary of the main points can really help; then send us your summary. Consider also sharing your travel adventures

whenever you see things of geological interest. You will get the credit and don't worry about style or whether you are a good writer. Judy seldom lets a mistake go by and rest assured we want you and the *News* to look top notch. Of course, you will always get a byline for your contribution as well. It is an excellent way to share the joy and excitement of geology with all your friends in GSM. Judy reports that we are about to get some more members on our tiny editorial board. They will certainly be welcome and we intend on providing proper introductions in the next edition of the *News*. Lastly, no statement of credits would be complete without noting our friends at the University of Minnesota Department of Geology and Geophysics and the Geological Survey. A rock solid bunch if ever there was one.

Dwight Robinson



**Silica:** The oxide of the atomic element (atom) silicon (chemical shorthand Si). Silicon combines with two oxygen atoms (chemical shorthand O) making the compound molecule silicon dioxide (SiO<sub>2</sub>). The most common form of silica is quartz and its erosion product, sand.

Rose is Rose

By Pat Brady



## 1995-96 GSM DIRECTORY

The 1995-96 GSM Directory has been published and mailed and is beautiful. The new directory is more than a member roster — it is chock full of information. It lists GSM goals, lecture and field trip information, current GSM projects, member information and much much more. If you are a paid member of the Society and have not as yet received your directory, call Doug Zbikowsky to request a copy.

The purpose of this newsletter is to inform the members and friends of the activities of the geological society of Minnesota. NEWS is published four times a year: February 15th, May 15th, August 15th and November 15th. Deadline for article submission is the first day of the month of publication.

Officers: Doug Zbikowski, *President*; Mariya Lowe, *Vice President*; ED Huppeler, *Treasurer*; Pat Johnson, *Secretary*

Directors: Charles Brennecker, Dick Hegland, Rick Hosterman, Alex Lowe, Don Swenson

Membership Chair and Information: Fran Concoran 724-2101



FIRST CLASS

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Please Forward